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PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37
C.F.R. § 1.53(c).

TITLE: ERASABLE RECYCLABLE PAPER PRODUCT

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- ☒ 7 pages of specification are enclosed.
- ☒ Provisional Filing Fee Amount:
☒ \$160, large entity
- ☒ A check in the amount of \$160.00 to cover the filing fee is enclosed.
- ☒ The Director is hereby authorized to charge any additional fees required to file this provisional application herewith, or credit over-payment, to Account No. 02-4550. A copy of this sheet is enclosed.
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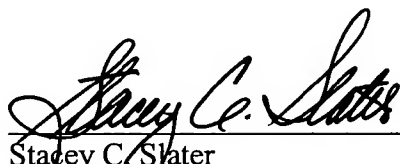
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- 1 -

ERASABLE RECYCLABLE PAPER PRODUCT

FIELD

This invention concerns paper products, particularly erasable, recyclable, and
5 repulpable paper products, such as erasable paper note products, and kits comprising
such products.

BACKGROUND

10 Erasable surfaces are known, such as dry erasable boards, commonly referred to
as white boards. Also known are erasable labels that are intended for labeling items
such as CD's and DVD's. Kits can be purchased that include a marker and a product
having a surface coating that is erasable, at least for a limited period of time. These
known products, however, are not both recyclable and repulpable.

15 It also is known to use a fluorine-based treatment for creating cloth and/or paper
surfaces that resist staining. Such surfaces potentially are erasable. These fluorine-
based systems, however, recently have been associated with health concerns and are no
longer being used commercially.

The present application provides a new erasable paper product that is both
20 recyclable and repulpable, and does not have the health issues associated with the
fluorine-treated products.

SUMMARY

An erasable, recyclable, and repulpable paper product is described. Disclosed
25 embodiments of the paper product comprised a calendered, coated base sheet. The
coating of this base sheet comprised a pigment or pigments, and typically also included
a binder and a starch. A second coating was applied to this base sheet. The second
coating comprised sodium alginate, polyvinyl alcohol, and combinations thereof. In

- 2 -

certain disclosed embodiments the pigment was selected from the group consisting of ground clay, calcium carbonate, kaolin clay, and combinations thereof; the binder was latex; and the starch was ethylated starch. The second coating is applied to the base sheet in an amount sufficient to produce a suitable erasable paper product. A person of
5 ordinary skill in the art will recognize that this amount will vary. However, suitable products have been made wherein the second coating is applied at a coating weight of from about 0.5 pound/3000 feet² to 2 pounds/3000 feet². A working embodiment of the paper product comprised sodium alginate as a second coating applied at a coating weight of about 0.5 pound/3000 feet².

10 Disclosed embodiments of the coated, erasable paper can be used to make various products. For example, note products, having a sticky adhesive side, can be made such that the note paper is erasable. A disclosed embodiment of such a product comprised a sheet product having a first surface and a second surface. An adhesive typically is applied to only one surface, such as the second surface, and typically is
15 applied only to a portion of the second surface. The sheet comprises a base sheet comprising a calendared, coated paper product having a second coating composition applied thereto, the second coating comprising sodium alginate, polyvinyl alcohol, or combinations thereof.

The various products that can be formed using the disclosed paper embodiments
20 can be sold in a kit. For example, such a kit might comprise a paper product comprising a calendared, coated base sheet, and a second coating comprising, for example, sodium alginate, polyvinyl alcohol, and combinations thereof. Included with the kit is a marker, such as a permanent or semi-permanent marker.

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DETAILED DISCUSSION

Disclosed embodiments of the present paper product comprise both a base sheet and one or more coatings for that base sheet. Each of these parts is described in further detail below.

- 3 -

The disclosed embodiments are designed to be erasable. By way of providing a theory of operation, and not to limit the invention, it has been observed that inks applied to surfaces having limited porosity do not significantly penetrate those surfaces and hence are more likely to be erasable. Therefore, selecting a base sheet that has limited porosity, such as a super calendared base sheet, provides a superior erasable product. Solely by way of example, a coated, super calendared base sheet was selected for some embodiments of the present invention.

After selecting a suitable base sheet, the end product can be engineered to further increase its erasability. One way to modify the erasability of a paper product is to apply one or more coatings. The effectiveness of a particular coating is partially dependent on two criteria. First, the material should be capable of forming films, and hence useful for coating paper products. Second, the material should resist solvent absorption and/or adsorption for applied inks, i.e., the material should have good "solvent hold out."

While some conventional coatings exhibit these properties, for certain applications, it also is desirable to make the erasable paper product both recyclable and/or repulpable. Many of the commonly used polymeric coatings are not recyclable and/or repulpable and therefore are not suitable for these applications.

Some embodiments of the present invention comprise a base sheet, a first coating, and a second coating. The first coating can comprise: one or more pigments, such as ground clay, precipitated calcium carbonate, kaolin clay, etc.; one or more binders, such as a latex binder; and one or more starches, such as an ethylated starch.

In a constructed embodiment, the first coating comprised: 70 parts fine number one clay, such as Hydragloss 90; 30 parts ground carbonate, such as Carbital 95; 3.85 parts ethylated starch, such as Penaford Gum 380; and 12 parts latex, such as Dow 620. The basis weight of the coated paper was 50 pounds / 3000 ft², of which the base sheet accounted for about 40 pounds/3000 feet² and the coating accounted for about 10 pounds/3000 feet². In some embodiments, the ethylated starch and latex are added

- 4 -

incorporated into the formulation together and comprise from 0.1 to 30 parts of the formulation, typically 0.1 to 20 parts of the formulation. In other embodiments, the first coating comprises from 0 to 100% fine number one clay and/or from 0 to 100% ground carbonate.

5 In the constructed embodiment, the base sheet was hot soft calendered to obtain the desired surface smoothness and sheet density. In other embodiments, the base sheet can be supercalendered.

 Some embodiments of the present invention comprise a second coating (i.e. a "top coat" or "surface treatment") in addition to the first coating described above. The
10 second coating can comprise one or more sealing components, such as sodium alginate and/or polyvinyl alcohol (typically, fully hydrolyzed polyvinyl alcohol).

 In a constructed embodiment, the second coating was made by applying a 3.5% sodium alginate, water-based solution onto a paper product comprising a calendered base sheet and a first coating. The second coating can be applied by using a coating
15 apparatus selected to provide a particular coating weight, such as a #3 Meyer rod. The coat weight for the second coating in the constructed embodiment was about 0.5 pounds/3000 feet². In other embodiments, the coat weight for the second coating can be from about 0.5 pounds/3000 feet² to about 2 pounds/3000 feet², typically from about 0.3 pounds/3000 feet² to about 2 pound/3000 feet². The desired coat weight depends on the
20 coating requirements and the physical properties of the second coating formulation, such as the viscosity of the second coating formulation.

 After the coating dried, the surface of the constructed embodiment was tested with several different solvent-based markers for erasability. The product demonstrated its ability to be erased several times while retaining important characteristics of a paper
25 product.

- 5 -

I CLAIM:

1. An erasable, recyclable, and repulpable paper product, comprising:
a calendered, coated base sheet, the coating comprising pigment, a binder and a
5 starch; and
a second coating comprising sodium alginate, polyvinyl alcohol, and
combinations thereof.
2. The paper product according to claim 1 wherein the pigment is selected
10 from the group consisting of ground clay, calcium carbonate, kaolin clay, and
combinations thereof.
3. The paper product according to claim 1 wherein the binder is latex.
- 15 4. The paper product according to claim 1 wherein the starch is ethylated
starch.
5. The paper product according to claim 1 wherein the second coating is
applied at a coating weight of from about 0.5 pound/3000 feet² to 3.0 pounds/3000 feet².
20
6. The paper product according to claim 1 wherein the second coating is
sodium alginate applied at a coating weight of about 0.5 pound/3000 feet².
7. A kit, comprising:
25 a paper product comprising a calendered, coated base sheet, the coating
comprising pigment, a binder and a starch, and a second coating comprising sodium
alginate, polyvinyl alcohol, and combinations thereof; and
a permanent or semi-permanent marker.

- 6 -

8. The paper product according to claim 7 wherein the pigment is selected from the group consisting of ground clay, calcium carbonate, kaolin clay, and combinations thereof, the binder is latex, and the starch is ethylated starch.

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9. The paper product according to claim 7 wherein the second coating is applied at a coating weight of from about 0.5 pound/3000 feet² to 3.0 pounds/3000 feet².

10. The paper product according to claim 7 wherein the second coating is sodium alginate applied at a coating weight of about 0.5 pound/3000 feet².

11. A note paper product, comprising:
a sheet product having a first surface and a second surface, at least the second surface having an adhesive material on a portion of the second surface, the sheet comprising a base sheet comprising a calendared, coated paper product; and
a second coating composition comprising sodium alginate, polyvinyl alcohol or combinations thereof.

12. The paper product according to claim 11 wherein the coated paper product comprises a pigment, a binder, and a starch.

13. The paper product according to claim 1 where the pigment is selected from the group consisting of ground clay, calcium carbonate, kaolin clay, and combinations thereof, the binder is latex, and the starch is ethylated starch.

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14. The paper product according to claim 11 wherein the second coating is applied at a coating weight of from about 0.5 pound/3000 feet² to 3.0 pounds/3000 feet².

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- 7 -

15. The paper product according to claim 11 wherein the second coating is sodium alginate applied at a coating weight of about 0.5 pound/3000 feet².